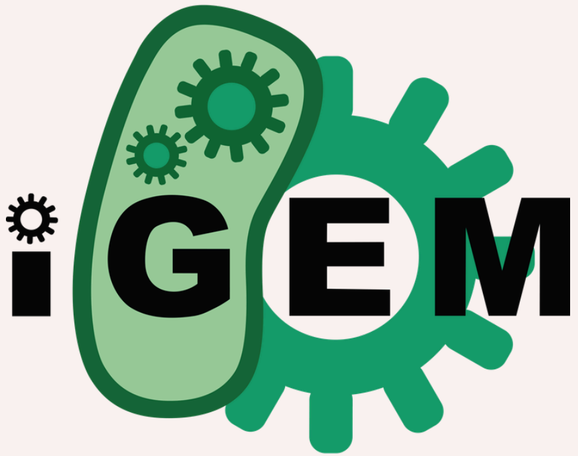
IGEM THESSALONIKI X THARSIN

Bioethics: Law in Biology

PROTECTING HUMAN RIGHTS IN RESEARCH



What is iGEM?



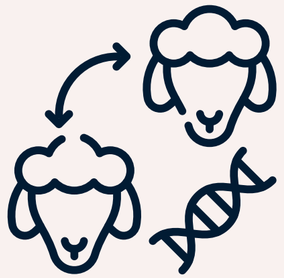
- The largest global Synthetic Biology competition
- Started in 2003 by MIT
- Biology is treated as "engineering." We use biological tools to solve real-world problems

The history of iGEM Thessaloniki

2017	2018	2019	2020-2021	2022	2023	2024	2025
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CLONING

What is it, how is it performed, why is it performed?

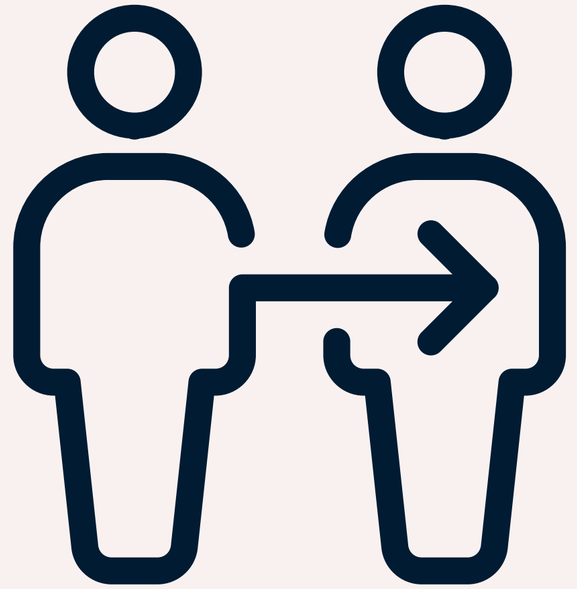




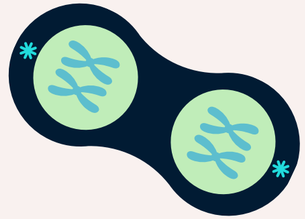
What is cloning?

- Cloning does not always mean creating a “human replica”.
- In biology, it means creating genetically identical material.
- It can involve: a gene, a cell, a tissue, or a whole organism.

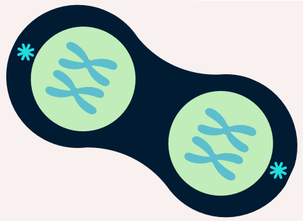
Therefore, before discussing whether it is ethically acceptable, we must clarify which form of cloning we are talking about



Main forms of cloning



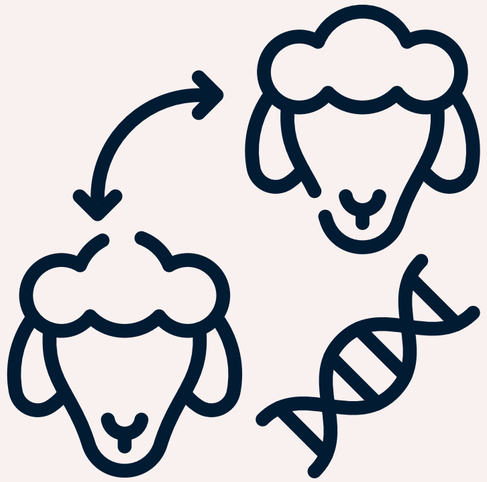
Type	What does it mean	Example
Molecular cloning	DNA replication	Lab research → PCR
cellular cloning	creation of cells for treatment	Regenerative medicine
reproductive cloning	creation of organism	Dolly the sheep



The case of Dolly the sheep

- Dolly was the first mammal to be cloned from an adult cell.
- It was not just a scientific achievement.
- It changed the public debate surrounding: the limits of biotechnology, human reproduction, identity, safety, and the relationship between science and society.

Dolly died in 2003, at the age of about 6.5 years, via euthanasia by veterinarians because she had developed a progressive lung disease



Reasons for cloning

- Research: studying genes, development, and diseases.
- Medicine: potential production of compatible cells or tissues.
- Animal husbandry: breeding animals with desirable traits.
- Species conservation: efforts to protect endangered animals.
- Reproduction: the most controversial scenario, especially in humans.



The bioethical turning point - last slide"

- The question is not just: “Can we do it?”
- But:
- For what purpose?
- At what risk?
- Who benefits?
- Who might be harmed?
- Where does treatment end and intervention in human life begin?

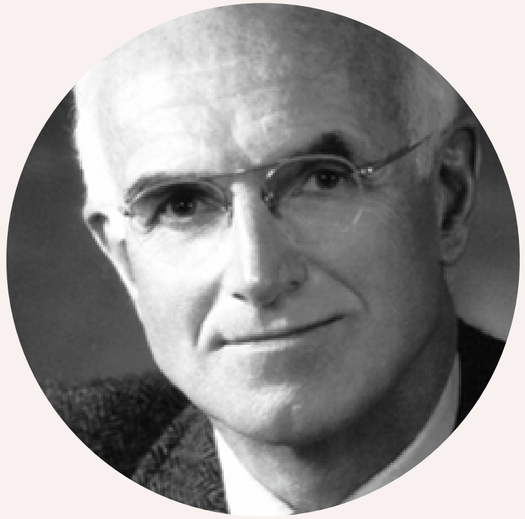


Organ Transplantation

What is it, how is it performed, why is it performed?



Historical Background



Joseph E. Murray, 1954
First successful kidney transplant between twins
It constituted the first truly successful human organ transplant

Christiaan Barnard, 1967
First successful human heart transplant

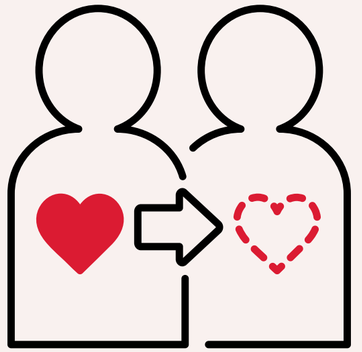


According to WHO

- Approximately 170,000-175,000 organ transplants are performed worldwide every year.
- However, this covers less than 10% of the actual global need.

Therefore:

- >90% of patients who need a transplant DO NOT receive one.



Histocompatibility as a barrier in organ transplantation

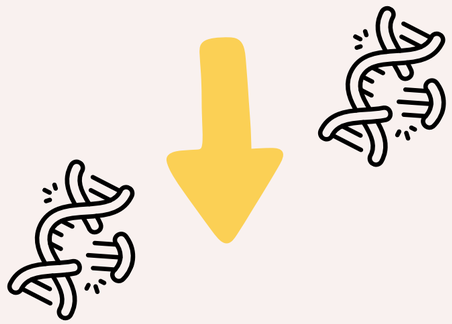
The risk remains that:

- **The recipient's immune system will recognize the donor's organ cells as 'non-self'**
- **An immune response (Type IV / cell-mediated) will be initiated**
- **Leading to graft rejection**



Ideal scenario

If only the recipient could receive a graft consisting of cells that carry an identical identity to their own



COMPLETE HISTOCOMPATIBILITY

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THANK YOU!



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